

CLAIMS

1. A pseudo 3-D space representation system for representing a pseudo 3-D space with a plurality of 2-D images, comprising:

a specified area associating means for associating one or more sets of areas specified on one image and the other image or images as common parts;

an image transforming means for transforming one or both images through affine transformation by matching the corresponding areas specified on the images; and

an image display means for displaying both images as superposed on each other.

2. A pseudo 3-D space representation system as defined in claim 1, which further comprises an operation image display means for displaying a plurality of images and an area specifying means for allowing a user to specify areas on each of two or more images displayed to the user.

3. A pseudo 3-D space representation system for representing a pseudo 3-D space with a plurality of 2-D images, comprising:

a specified area transforming means for transforming an area specified on an image through affine transformation;

a specified area retrieving means for retrieving a part common with the specified area from plural images;

an image transforming means for transforming one or both images through affine transformation in such a way that the specified area and the retrieved area may be matched with each

other; and

an image display means for displaying both images superposed on each other.

4. A pseudo 3-D space representation system as defined in claim 3, which further comprises an operation image display means for displaying an image and an area specifying means for specifying an area on the displayed image.

5. A pseudo 3-D space representation system as defined in any one of claims 1 to 4, which further comprises a transparency specifying means for specifying transparency for one image respective to the other image and wherein the image display means displays the images according to the specified transparency of the image.

6. A pseudo 3-D space representation system as defined in any one of claims 1 to 4, wherein the image is provided with metadata and the image display means is provided with a metadata display means for displaying metadata added to the image when user selects the image.

7. A pseudo 3-D space representation system as defined in any one of claims 1 to 4, wherein the image transforming means has a means for transforming image shape in order that the selected image or the specified image of the both images superposed each other by the image display means is transformed to the original shape, the image shape being the shape of the other image of the both images or the both images, and the image display means has an image presenting means for presenting

selectable images other than the original one and a display image changing means for changing the displayed images by displaying both images transformed by the image transforming means.

8. A pseudo 3-D space representation system as defined in claim 7, wherein the image transforming means has an interpolation image generating means for generating a series of interpolating images by affine transformation until a next original image is displayed and the display image changing means has an interpolation image display means for subsequently displaying the interpolation images generated by the interpolation image generating means.

9. A pseudo 3-D space representation system as defined in claim 8, which further comprises a traversing time changing means for changing a traversing time necessary for changing display image from an unchanged image to an original image to represent a pseudo temporal distance according to a difference between the unchanged image and the original image.

10. A pseudo 3-D representation system as defined in claim 8, wherein each image is provided with metadata including at least time information and a calculation means is provided for calculating a time necessary for changing to display from an original image of one image to the another and the changing is completed within the calculated time.

11. A pseudo 3-D space representation system as defined in claim 8, wherein each image is provided with metadata including

at least information about a position and a direction thereof, a calculation means is provided for calculating relative positions for each of two images according to the metadata and changing to display from an original image of one image to the another is completed according to the specified relationship between two positions.

12. A pseudo 3-D space representation system as defined in any one of claims 1 to 4, wherein the image display means has an area presenting means for selectively presenting an area on an image associated with an area on another image and a display image changing means for changing display image by displaying the associated original image of the another image when the area presented by the area presenting means is selected.

13. A pseudo 3-D space representation system as defined in claim 12, wherein the image transforming means has an interpolation image generating means for generating a series of interpolating images by affine transformation until a next original image is displayed and the display image changing means has an interpolation image display means for subsequently displaying the interpolation images generated by the interpolation image generating means.

14. A pseudo 3-D space representation system as defined in claim 13, which further comprises a traversing time changing means for changing a traversing time necessary for changing display image from an unchanged image to an original image to represent a pseudo temporal distance according to a difference

between the unchanged image and the original image.

15. A pseudo 3-D space representation system as defined in claim 13, wherein each image is provided with metadata including at least time information and a calculation means is provided for calculating a time necessary for changing to display from an original image of one image to the another and the changing is completed within the calculated time.

16. A pseudo 3-D space representation system as defined in claim 13, wherein each image is provided with metadata including at least information about a position and a direction thereof, a calculation means is provided for calculating relative positions for each of two images according to the metadata and changing to display from an original image of one image to the another is completed according to the specified relationship between two positions.

17. A pseudo 3-D space representation system as defined in any one of claims 1 to 4, wherein the image display means displays specified two or more images in succession in the specified order.

18. A pseudo 3-D space representation system as defined in any one of claims 1 to 4, wherein an image is provided with metadata including at least information about a position and a direction thereof and there is provided a means for identifying a position of the image based on the each metadata and associating the metadata with the electronic map and a means for displaying the image identified by the metadata on the electronic map.

19. A pseudo 3-D space constructing system, which has a server device functioning as a pseudo 3-D space representation system defined in any one of claims 1 to 18 and connected to a number of client devices through a network, wherein the server device has an image database storing a plurality of images, provides function of the pseudo 3-D space representation system to the client devices through the network, receives from the client device an image associated with a specified area of an image stored in the database by using the pseudo 3-D space representation system and stores said image into the database.

20. A game system for playing a game for specifying an area on an image by using the pseudo 3-D space representation system defined in any one of claims 1 to 18, further specifying an area of another image associated with the specified area and repeating the same until all specified images are linked, which has an image database storing a plurality of image groups each composed of a plurality of images associated with each other in such a way that areas of images can be linked only in a specified order and which presents a group of images for users to specify areas one on each of two images, links two specified areas, adds points of the links and presents remaining images of the group excepting two images which areas were specified and repeats the same steps.

21. An electronic map display system, wherein a pseudo 3-D space representation images created by using the pseudo 3-D space representation system defined in any one of claims 1 to

18 is embedded in a corresponding position on an electronic map or linked thereto and displayed thereon.

22. An electronic map providing system equipped with a server device having an electronic map database containing a pseudo 3-D spatial electronic map prepared by embedding in corresponding positions thereof or linked thereto a pseudo 3-D space representation images created by using a pseudo 3-D space representation system defined in any one of claims 1 to 18, wherein the server device connected to a number of client devices through a network retrieves the pseudo 3-D special electronic map in the electronic map database in response to access from the client device and provides it to the client device.

23. A navigation system equipped with a server device including an electronic map database containing a pseudo 3-D spatial electronic map prepared by embedding in corresponding positions thereon or linked thereto a pseudo 3-D space representation image created by using a pseudo 3-D space representation system defined in any one of claims 1 to 18, wherein the server device is connected to a number of client devices capable of detecting its present position through network and, in response to an access from any client device indicating its current position, it retrieves in the electronic map database and provides the client device with pseudo 3-D spatial electronic map corresponding to the current position, thus navigating the user of the client device.

24. A navigation system including an electronic map database

containing a pseudo 3-D spatial electronic map prepared by embedding in corresponding positions thereon or linked thereto a pseudo 3-D space representation image created by using a pseudo 3-D space representation system defined in any one of claims 1 to 18, which navigates a user by detecting a current position, searching an electronic map corresponding to the detected current position in the electronic database and displaying the pseudo 3-D spatial electronic map on a display screen of the user device.

25. A pseudo 3-D space representing method for creating a pseudo 3-D spatial representation by executing steps of displaying a plurality of images to a user, causing the user to specify areas on each of two or more images, associating the specified area of one displayed image with the specified area of the other displayed image as common parts, transforming the shape of one or both images through affine transformation by matching the paired areas and superposing both images.

26. A pseudo 3-D space representing method for creating a pseudo 3-D spatial representation through steps of displaying an image to a user, causing the user to specify an area on the displayed image, transforming the specified area by affine transformation, retrieving a part common to the specified area from a plurality of images, transforming the shape of one or both images through affine transformation to match the specified area with the area extracted by the retrieval and displaying both images superposed on each other.

27. A pseudo 3-D space constructing method for constructing a pseudo 3-D space by performing the pseudo 3-D space representing method defined in claim 25 or 26 by using a server device connected to a number of client devices through a network and having an image database containing a plurality of images, wherein the server device causes a client device connected thereto through a network to perform the pseudo 3-D space representing method and associate an image with a specified area of an image stored in the image database by using the pseudo 3-D space representing method and store said image into the image database.

28. An electronic map displaying method whereby a pseudo 3-D spatial representation image prepared by the pseudo 3-D space representing method as defined in claim 25 or 26 is embedded in a corresponding position on an electronic map or linked thereto to display the same representation image on the electronic map.

29. A navigation method for navigating users by providing through a network a pseudo 3-D spatial electronic map prepared by the pseudo 3-D space representing method as defined in claim 25 or 26 and embedded in or linked to corresponding positions on the electronic map.

30. A program for causing a computer to work as a pseudo 3-D space representation system defined in any one of claims 1 to 18 or as a pseudo 3-D space constructing system defined in claim 19 or as a game system defined in claim 20 or as an electronic map display system defined in claim 21 or as an

electronic map providing system defined in claim 22 or as a navigation system defined in claim 23 or 24.

31. A program for causing a computer to carry out a pseudo 3-D space representing method as defined in claim 25 or 26 or a pseudo 3-D space constructing method as defined in claim 27 or as an electronic map providing method as defined in claim 28 or as a navigation method as defined in claim 29.

32. A computer readable recording medium with a recorded program defined in claim 29 or 30.